

CLAIMS

- [1] A method of measuring a component in blood, comprising:
causing a redox reaction between the component in the blood and an
5 oxidoreductase in the presence of a mediator;
detecting an oxidation current or a reduction current caused through
the redox reaction by an electrode system; and
calculating an amount of the component based on a value of the
detected current,
10 wherein the method further comprises measuring a Hct value of the
blood and correcting the amount of the component using this Hct value, the
measurement of the Hct value comprising:
providing an electrode system having a working electrode and a
counter electrode;
15 providing a mediator on the counter electrode but not on the working
electrode;
supplying the blood to the electrode system;
applying a voltage to the electrode system in this state to cause an
oxidation current or a reduction current to flow between the electrodes;
20 detecting the oxidation current or the reduction current; and
calculating the Hct value based on a value of the detected current.
- [2] The method according to claim 1, wherein the mediator used for the
measurement of the Hct value is a ferricyanide.
- [3] The method according to claim 2, wherein the ferricyanide is potassium
25 ferricyanide.
- [4] The method according to claim 1, wherein, in the measurement of the
Hct value, the working electrode on which the mediator is not provided is
coated with a polymeric material.
- [5] The method according to claim 4, wherein the polymeric material is
30 carboxymethylcellulose.

[6] The method according to claim 1, wherein the voltage applied in the measurement of the Hct value is equal to or higher than a voltage causing electrolysis of water.

5 [7] The method according to claim 1, wherein the voltage applied in the measurement of the Hct value is 1 to 10 V.

[8] The method according to claim 1, wherein the voltage applied in the measurement of the Hct value is 1 to 6.5 V.

10 [9] The method according to claim 1, wherein the correction using the Hct value is carried out based on one of a calibration curve and a calibration table that have been prepared previously for showing a relationship between a Hct value and an amount of the component.

[10] The method according to claim 1, wherein the Hct value is measured after the amount of the component has been measured.

15 [11] The method according to claim 1, wherein the electrode system for detecting the oxidation current or the reduction current of the component comprises a working electrode and a counter electrode.

[12] The method according to claim 1, further comprising measuring a temperature of a measurement environment,

20 wherein the amount of the component is corrected using the measured temperature.

[13] The method according to claim 1, wherein the correction using the temperature is carried out based on one of a calibration curve and a calibration table that have been prepared previously for showing a relationship between a blood temperature and an amount of the component.

25 [14] The method according to claim 1, wherein the component to be measured is at least one selected from the group consisting of glucose, lactic acid, uric acid, bilirubin, and cholesterol.

[15] The method according to claim 1, wherein the component to be measured is glucose, and the oxidoreductase is at least one of glucose oxidase
30 and glucose dehydrogenase.

[16] A sensor for measuring a component in blood by causing a redox reaction of the component and detecting an oxidation current or a reduction current caused through the redox reaction by an electrode,

wherein the sensor comprises:

5 a first analysis portion comprising a first electrode system on which at least an oxidoreductase that acts upon the component and a mediator are provided; and

a second analysis portion comprising a second electrode system that comprises a working electrode and a counter electrode, a mediator being
10 provided on the counter electrode but not on the working electrode,

in the first analysis portion, the component in the blood is measured by causing a redox reaction between the component and the oxidoreductase in the presence of the mediator and detecting by the first electrode system an oxidation current or a reduction current caused to flow when a voltage is
15 applied, and

in the second analysis portion, a Hct value of the blood is measured by supplying the blood to the second electrode system, applying a voltage to the blood in this state to cause an oxidation current or a reduction current to flow between the working electrode and the counter electrode, and detecting a
20 value of the oxidation current or the reduction current.

[17] The sensor according to claim 16, capable of correcting an amount of the component based on the measured Hct value.

[18] The sensor according to claim 16, wherein the working electrode and the counter electrode in the second electrode system are provided on a same
25 insulating base material so as to be coplanar and spaced apart from each other.

[19] The sensor according to claim 16, further comprising a channel for leading blood to the sensor,

wherein the second analysis portion is on an upstream side and the
30 first analysis portion is on a downstream side with respect to flow of the blood

supplied from one end of the channel.

[20] The sensor according to claim 16, further comprising a channel for leading blood to the sensor,

5 wherein, in the second electrode system, the working electrode is on an upstream side and the counter electrode is on a downstream side with respect to flow of the blood supplied from one end of the channel.

[21] The sensor according to claim 16, wherein the mediator in the second electrode system is a ferricyanide.

10 [22] The sensor according to claim 21, wherein the ferricyanide is potassium ferricyanide.

[23] The sensor according to claim 16, wherein, in the second electrode system, the working electrode on which the mediator is not provided is coated with a polymeric material.

15 [24] The sensor according to claim 23, wherein the polymeric material is carboxymethylcellulose.

[25] The sensor according to claim 16, wherein, in the second electrode system, the applied voltage is equal to or higher than a voltage causing electrolysis of water.

20 [26] The sensor according to claim 16, wherein, in the second electrode system, the applied voltage to is 1 to 10 V.

[27] The sensor according to claim 16, wherein, in the second electrode system, the applied voltage is 1 to 6.5 V.

[28] The sensor according to claim 16, wherein the first electrode system comprises a working electrode and a counter electrode.

25 [29] The sensor according to claim 28, wherein, in the first electrode system and the second electrode system, at least one of the electrodes or all the electrodes provided in the first electrode system also serve as the counter electrode in the second electrode system.

30 [30] The sensor according to claim 28, wherein, in the first electrode system and the second electrode system, only the working electrode in the first

electrode system also serves as the counter electrode in the second electrode system.

[31] The sensor according to claim 16, wherein the mediator provided on the first electrode system is a ferricyanide.

5 [32] The sensor according to claim 31, wherein the ferricyanide is potassium ferricyanide.

[33] The sensor according to claim 16, further comprising an insulating substrate,

10 wherein the first analysis portion, the second analysis portion, and a channel for leading the blood to the analysis portions are formed on the insulating substrate, and

one end of the channel is open toward an outside of the sensor so as to serve as a blood supply port.

15 [34] The sensor according to claim 33, wherein there is only one blood supply port, and the channel branches so that ends of branched portions communicate with the analysis portions, respectively.

[35] The sensor according to claim 33, wherein the second analysis portion is located in the channel, and the first analysis portion is located farther from the blood supply port than the second analysis portion.

20 [36] The sensor according to claim 33, further comprising a spacer and a cover,

wherein the cover is disposed on the insulating substrate via the spacer.

25 [37] The sensor according to claim 16, wherein the component to be measured is at least one selected from the group consisting of glucose, lactic acid, uric acid, bilirubin, and cholesterol.

[38] The sensor according to claim 16, wherein the component to be measured is glucose, and the oxidoreductase is at least one of glucose oxidase and glucose dehydrogenase.

30 [39] The sensor according to claim 16, wherein a polymeric material, an

enzyme stabilizer, and a crystal homogenizing agent further are provided on the first electrode system.

[40] The sensor according to claim 16, further comprising a blood detecting electrode,

5 wherein the blood detecting electrode is located farther from the blood supply port than at least one of the analysis portions so that whether or not the blood is supplied to the at least one of the analysis portions can be detected by the blood detecting electrode.

[41] A measuring device for measuring a component in blood, comprising:

10 means for holding the sensor according to claim 16;

 means for applying a voltage to the first electrode system of the sensor;

 means for detecting an oxidation current or a reduction current flowing through the first electrode system;

15 means for calculating an amount of the component from a value of the detected current;

 means for applying a voltage to the second electrode system of the sensor;

20 means for detecting an oxidation current or a reduction current flowing through the second electrode system; and

 means for calculating a Hct value of the blood from a value of the detected current.

[42] The measuring device according to claim 41, further comprising means for correcting the amount of the component using the Hct value.

25 [43] The measuring device according to claim 41, wherein the voltage applied to the second electrode system is equal to or higher than a voltage causing electrolysis of water.